AMENDMENTS TO THE DRAWINGS:

Applicants submit concurrently herewith two (2) replacement drawings illustrating Figs. 1 and 2, accompanied by annotated drawings showing the changes in red ink.

Attachments: Replacement Sheets: 2
Annotated Sheets: 2

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

In response to the drawing objection, suitable drawing amendments have been effected by the attached replacement sheets so as to obviate all stated grounds of objection.

Accordingly, all formal issues are now believed to have been resolved in the applicants' favor.

The rejection of claims 1-15 under 35 U.S.C. §102 as allegedly being anticipated by Friedman is respectfully traversed.

Friedman is concerned with estimating the size of a static multicast audience and controlling feedback under such static conditions. Friedman does not consider the problem of tracking the size of a multicast audience as it changes over time, during a session. Nor does Friedman consider the problem of adapting the value of a probabilistic polling parameter to accommodate for changes in the audience size.

The present inventors have reviewed conventional multicast methods and realized that, in real, large-scale multicast, the size of the audience can vary significantly during a session. The present inventors found that this characteristic of large-scale multicast is not

adequately addressed in the art. In particular, large changes can be experienced in membership build-up and termination phases. The present inventors determined that, during these phases, the audience size could increase (or decrease) rapidly by orders of magnitude.

In such a dynamic setting, the straightforward application of the algorithm disclosed in Friedman to compute a value for the maximum audience size and, from that, a suitable value for the probabilistic polling parameter would result in an estimate of maximum audience size that was either highly inaccurate or which converges to the average value over the entire session. In both cases, this would result in the computation of an unsuitable value of the probabilistic polling parameter which would, in turn, result either in feedback implosion or in a highly inaccurate estimation of audience size.

The features disclosed in Friedman do not solve the problem addressed by the present invention, i.e., dynamically tracking the size of a time-varying audience with probabilistic polling while avoiding feedback implosion.

The present invention is now discussed in more detail in order to better convey how the invention differs from and is superior to methods known in the art.

As discussed above, use of a probabilistic polling parameter to poll an audience of unknown size is known. However, the present invention includes a technique not

previously described in the art: from (a) the value of probabilistic polling parameter selected for polling and (b) the count received as a result of a poll, forecasting an upper bound for the number of receivers and determining therefrom a new value of the parameter for use in a subsequent poll.

Typically, conventional multicast methods require a very small initial value of probabilistic polling parameter so as to minimize the chances of an excessive level of response (so-called "feedback implosion"). For example, Friedman refers, at page 965, in the second paragraph of the right-hand column, to the Bolt, Turletti and Wakeman (BTW) technique in which an initial value for the parameter is chosen that is so small (e.g., 2^{-16}) that no feedback at all is generated to the first poll and, quite possibly, to a number of subsequent polls. The value of the BTW parameter is then increased gradually but polling is stopped as soon as any feedback is received. No forecasting of an upper bound for the number of receivers is described in relation to the BTW technique and, in fact, there is no need for such a calculation with BTW as polling is stopped as soon as any feedback is received.

Friedman also refers, at page 966, section B, starting from the third paragraph, to a second polling technique: the Nonnenmacher Biersack (NB) technique. However, unlike the present invention, NB relies on a timer at each receiver and sends requests containing

timer parameters, rather than the probabilistic polling parameter of the present invention. The NB technique thus leads the skilled reader way from the present invention. The Examiner has not referred to the NB technique, presumably due its lack of similarity to the present invention.

Returning to the teaching of Friedman, an attempt is made there to improve upon the BTW technique. At section D on page 968, Friedman describes determination of an upper bound for a probabilistic polling parameter with a view to avoiding feedback implosion. It is noted straightaway that this does not read onto the "upper bound for the number of receivers" required by present claim 1. In fact, returning to section D, the skilled reader would note that Friedman assumes that the upper bound on the number of receivers is already known (see section D, page 968, the last three lines of the first paragraph). It will be noted that the solution proposed by Friedman leads the skilled reader away from the invention as Friedman provides no indication of a need to discover an upper bound on the number of receivers.

The present invention, as set out in claim 1, requires forecasting an upper bound for the number of receivers and, from the forecast value, determining an appropriate value for the probabilistic polling parameter. This is a radically different approach to Friedman according to which the upper bound for the number of receivers is given. No

motivation can be found in Friedman to process the count and probabilistic polling parameter values from a series of requests in order to allow repeated estimation of the maximum audience size, where the maximum value changes over time.

The present invention brings the advantage over Friedman of the ability to cope with a situation in which the number of receivers is changing during the course of the multicast transmission. The present invention, therefore, provides improved performance in multicast operations where audience size is varying significantly during the course of the multicast.

As demonstrated, above, the present invention is not found in or suggested by Friedman which includes teaching that leads away from the present invention. The present invention provides an end-to-end method where audience estimation, including very large-scale multicast, can be carried out at the application level. The invention alleviates the problems of the prior art by using an adaptive method for sampling feedback from receivers. The adaptive method minimizes the risk of feedback implosion and, at the same time, helps to ensure that the sender receives the maximum possible number of feedback messages.

Given such fundamental deficiencies of Friedman as have already been discussed, it is not believed necessary at this time to explain further deficiencies of this reference

with respect to other aspects of the rejected claims. Suffice it to note that, as a matter of law, it is impossible for a reference to anticipate any claim unless it teaches each and every feature of that claim.

Accordingly, this entire application is now believed to be in allowable condition, and a formal notice to that effect is earnestly solicited.

Respectfully submitted,

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